

Amendments to the Claims:

Please cancel claims 1 - 48 without prejudice or disclaimer of the subject matter thereof and add the following new claims.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 - 48 (Canceled).

49. (New) An electromagnetic ultrasonic transducer for coupling media free generation and/or reception of ultrasonic waves as linearly polarized transverse waves into and from a workpiece, having at least one unit for converting the ultrasonic waves inside the workpiece and including a coil for generating, and/or detecting a high-frequency magnetic field, a premagnetizing unit for generating a quasi-static magnetic field which superimposes the high-frequency magnetic field in the workpiece, with the coil being torus shaped on at least one partially toroidal magnetic core or at least one magnetic core including parallel pieces, and each core including two front ends which can be turned to face the workpiece; and wherein

the front ends of each magnetic core, which can be turned to face the workpiece, are connected directly or indirectly to a magnetic flux piece which has a surface which faces the workpiece and which connects the front ends to each other.

50. (New) An electromagnetic ultrasonic transducer for coupling media free generation and/or reception of ultrasonic waves as linearly polarized transverse waves into and from a workpiece, having at least one unit for converting the ultrasonic waves inside the workpiece and including coils for generating, or detecting a high-frequency magnetic field, a premagnetizing unit for generating a quasi-static magnetic field which superimposes the high-frequency magnetic field in the workpiece, with the coils being torus shaped on at least two partially toroidal magnetic cores or at least two magnetic cores including parallel pieces, including two front ends which can be turned to face the workpiece;

at least two magnetic flux guide pieces;

one front end of a magnetic core is connected directly or indirectly to one of the at least two magnetic flux guide pieces and another front end of a magnetic core is connected directly or indirectly to the another of the at least two magnetic flux guide pieces; and

one front end of another magnetic core is connected directly or indirectly to one of the at least two magnetic flux guide pieces and the another front end of the another magnetic core is connected directly or indirectly to the another of the at least two magnetic flux guide pieces which are separated from the first magnetic core; and wherein

the magnetic flux guide pieces each have a surface facing the workpiece.

51. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the at least two magnetic cores each have two parallel pieces connected via a connection piece, the front ends being located at the ends of the two parallel pieces;

between each parallel piece at least one further parallel piece is located which is connected on one side to the connection piece at an end of which another front end is located; and

at least one further magnetic flux guide piece connects front ends of the parallel pieces of both magnetic cores to each other.

52. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein for generating ultrasonic waves the coil is connected to a high-frequency generator for generating the high-frequency magnetic fields.

53. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein for generating ultrasonic waves the coils are connected to a high-frequency generator for generating the high-frequency magnetic fields.

54. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein for detecting ultrasonic waves the coil is connected to an amplifier unit and/or to an evaluation unit.

55. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein for detecting ultrasonic waves the coils are connected to an amplifier unit and/or to an evaluation unit.

56. (New) The electromagnetic ultrasonic transducer according to claim 49, comprising a transmission coil for generating the high-frequency magnetic field which is connected to a high-frequency generator and a reception coil for detecting the high-frequency magnetic field which is connected to an amplifier unit and/or to an evaluation unit.

57. (New) The electromagnetic ultrasonic transducer according to claim 50, comprising a transmission coil for generating a high-frequency magnetic field which is connected to a high-frequency magnetic generator and a reception coil for detecting the high-frequency magnetic field which is connected to an amplifier unit and/or to an evaluation unit.

58. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein the magnetic flux guide piece comprises a rod and contain soft magnetic material.

59. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the magnetic flux guide pieces each comprise a rod and contain soft magnetic material.

60. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein the magnetic flux guide piece comprises a stack of soft magnetic elements or an electrically nonconductive material containing soft magnetic particles distributed in the form of a matrix.

61. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the magnetic flux guide pieces comprise a stack of soft magnetic board elements or an electrically nonconductive material containing soft magnetic particles distributed in the form of a matrix.

62. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein the front ends of the at least one magnetic core are fused with the magnetic flux guide piece.

63. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the front ends of the magnetic cores are fused with the magnetic flux guide pieces.

64. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein the permagnetizing unit is located directly or indirectly on an upper side of the magnetic flux guide piece facing away from the workpiece.

65. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the permagnetizing unit is located directly or indirectly on an upper side of one of the magnetic flux guide pieces facing away from the workpiece.

66. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein the premagnetizing unit is a permanent magnet or an electromagnet.

67. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the premagnetizing unit is a permanent magnet or an electromagnet.

68. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein the premagnetizing unit permits the quasi-static magnetic field to be introduced into the workpiece perpendicular to the surface of the workpiece.

69. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the premagnetizing unit permits the quasi-static magnetic field to be introduced into the workpiece perpendicular to the surface of the workpiece.

70. (New) The electromagnetic ultrasonic transducer according to claim 49, wherein the premagnetizing unit is an electromagnet which introduces a quasi-static magnetic field horizontally into the surface of the workpiece.

71. (New) The electromagnetic ultrasonic transducer according to claim 50, wherein the premagnetizing unit is an electromagnet which introduces a quasi-static magnetic field horizontally into the surface of the workpiece.

72. (New) An arrangement for coupling media free generating and/or for receiving ultrasonic waves as linearly polarized transverse waves into and from a workpiece; wherein

at least two electromagnetic ultrasonic transducers according to claim 50 are spaced apart so that in longitudinal directions of the respective magnetic flux guide pieces individual ultrasonic transducers are aligned in parallel.

73. (New) The arrangement according to claim 71, wherein the premagnetizing unit of individual ultrasonic transducers are the same, or a single premagnetizing unit extends over all magnetic flux guide pieces of the ultrasonic transducers.

74. (New) A use of the arrangement according to claim 71 for generating and/or detecting horizontally polarized transverse waves, wherein the coils of the at least two electromagnetic ultrasonic transducers are operated by phase-array triggering.

75. (New) A use of the arrangement according to claim 74, wherein the coils of the electromagnetic ultrasonic transducers are triggered consecutively with a time-delayed phase trigger signal so that when ultrasonic waves are generated, the

ultrasonic waves which enter the workpieces have a direction which is dependent on the phase triggering and have a main direction of propagation movable between 0° and 90° in relation to a normal to the workpiece.

76. (New) A use of the arrangement according to claim 73, wherein for generating ultrasonic waves inside the workpiece, the coils of the individual ultrasonic transducers are triggered so that in two directly adjacent magnetic flux guide pieces, magnetic flux passes therein respectively oriented in opposite directions.

77. (New) An arrangement for coupling media free generating and/or for receiving ultrasonic waves which are linearly polarized into and from a workpiece; wherein

at least two electromagnetic ultrasonic transducers according to claim 50 are spaced apart from each other so that longitudinal directions of the respective magnetic flux guide pieces of the ultrasonic transducers are aligned in parallel.

78. (New) An arrangement for coupling media free generating and/or for receiving ultrasonic waves which are linearly polarized into and from a workpiece; wherein

at least two electromagnetic ultrasonic transducers according to claim 51 are spaced apart and from each other so that longitudinal directions of the respective magnetic flux guide pieces of the ultrasonic transducers are aligned in parallel.